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Prevalence of anemia and determination of some hematological parameters among pregnant women in Baghdad city

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Abstract

From 124 women in different stage of pregnancy ,there were 83 (67%) conceded anemic and 41(33%) were non anemic ,there were 54(65%) suffering from iron deficiency anemia. According to the form of anemia , 27 (32.5%) were suffering from mild anemia, 41 (49.4%) moderately anemia while15 (18.1%) severe anemia The number of anemic pregnant women from Baghdad was 39 (47%) and the internally displaced anemic pregnant women 44 (53%). the anemic pregnant women who were primigravida 36 (43.4%), while the pregnant women who were multipart gravida 47 (56.6%) .The number of anemic pregnant women was 26(31.3%) for age of 17-27y ,33(39.8%) for age of 28-37y and 24(28.9%)for age of 38-45y .while the number of anemic pregnant women was 43(41%) at the 1st trimester ,31(37%) at the 2nd trimester and 18(22%) at the 3nd .There were 62(69 %) from the total pregnant women got iron pills during the pregnancy period .From the total anemic pregnant women 9 (11%) recorded with pregnancy diabetes, 11 (13.3%) had pregnancy hypertension and 21(25%) suffered from placental previa,. The total RBC_s and WBC_s count during the 1st ,2nd and 3rd trimesters were (3.70±0.30, 3.96±0.59 and 4.76±0.24) .(4.62±1.23 , 8.31±2.45 and 13.22±3.60) respectively ,while the Hb levels were 8.78±1.39 , 10.93±1.21 and 12.33±0.18 at the pregnancy trimesters. Serum iron and serum firrtin levels in iron deficiency ,non- iron deficiency anemia were (31.24±9.7 and 37.2±12.7) ,(4.90±3.4 and 311.10±135.2) respectively.

Keywords: Pregnancy Anemia, Hematological Parameters .Serum Iron Levels

انتشار فقر الدم وتحديد بعض المحددات الدموية بين النساء الحوامل في مدينة بغداد

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الخلاصة

من بين 124 سيدة حامل في مختلف مراحل لحمل وجد ان 83 (67%) لديها فقر دم و41(33%) لا تعاني من فقر الدم وان 54(65%) تعاني من فقر الدم بسبب نقص الحديد. واعتمادا على نوع فقر الدم فأن 27(32%) لديها مرحلة بسيطة من فقر الدم41 (49,4%) تعاني من فقر دم متوسط و15 (18,1%)تعاني من فقر دم شديد .عدد النساء الحوامل المصابات بفقر الدم من سكنة بغداد 39(47%)والنازحات 44 (53%) عدد الحوامل المصابات بفقر الدم36 (43,4%) لأول حمل اما الحوامل ولديهم اكثر من ولادة فكانوا 47(56,6%) .اعمار النساء الحوامل 17–27 سنة كان عددهم 26(31,3%) و28– 37سنة عددهم 33

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(39,8%) و 24(28,9%) للاعمار 38–45 سنة . في الثلث الاول من الحمل بلغ عدد النساء الحوامل والمصابين بفقر الدم 43(41%) و 31 (37%) خلال الثلث الثاني و 18 (22%) للثلث الاخير من الحمل ، ومن بين جميع النساء الحوامل كان 62 (69%) يتناولون االقراص الحديد خلال فترة الحمل .
اما عدد الحوامل المصابات بمرض السكري فكان عددهم 9 (11%) و ارتفاع ضغط الدم 11 (13,3%) و21 (25%) لديهن تقدم في المشيمة بالإضافة الى فقر الدم ، اعداد كريات الدم الحمراء والبيضاء خلال مراحل الحمل الثلاث كانت (3,70±0,30، 3,96 ± 0,59 و4,76 ±0,24) و(4,62 ±1,25، 8,31 ±2,45 و13,22 ±3,60) بالتتابع. اما معدلات الهيموكلوبين فكانت 8,78 ±1,39، 10,93 ±1,21 و 12,33 ±0,18 خلال مراحل الحمل ، اما معدلات الحديد والفرتيين بين الحوامل المصابات بفقر الدم بسبب بنقص او عدم نقص الحديد فكانت (31,24 ±9,7 و37,2 ±12,7) و(4,90 ±3,4 و311,10 ±135,2) بالتتابع.

Introduction

All forms of anemia represent an important concern especially in pregnant women and iron deficiency considered the common reason for anemia [1]. World Health Organization has defined anemia during pregnancy as the hemoglobin concentration <11 g/dl and classified according to severity into Mild (Hb level between 10 - 10.9 gm/dl), Moderate (Hb level between 7 gm/dl - 9.9 gm/dl) and Severe (Hb level less than 7 gm/dl) [2, 3]. During menstruation and pregnancy women are more susceptible due to loss of iron [4].

The diet through pregnancy should contain protein, iron, vitamin B12, folic acid and mineral which are required for the hemoglobin production and Iron deficiency anemia (IDA) was considered to be one of the most vital factors of anemia [5]. Many factors can causes IDA among women including dietary deficiency or gastrointestinal disturbances as well as multiple pregnancies due to low iron stores and insufficient socio-economic requirements [6].

The requirements of iron in pregnancy is 0.8mg daily in first trimester, 4-5mg daily in second trimester and 6mg daily in third trimester .and this will make the iron stores utilized for continuous demanding supply and the total requirements of iron are approximately 1000mg through the pregnancy period [7].

The aim of the study was to determination the prevalence of anemia during pregnancy and study the effect of some socio-demographic and clinical characters among pregnant women, also, the relation between some hematological parameters and gestational age of anemic pregnant women and to detect the variance of serum iron and serum firrtin levels in iron deficiency pregnant women.

Patients and methods

Total of 124 pregnant women in the first, second and third trimester attended to department of gynecology and delivery at Al-Karkh hospital in Baghdad , at age of (18-45) years, from the period from March 2015-Octobert 2016.

The information was collected directly from the pregnant women and the patient´s agreement was taken for the research accomplishment, the questions parameters included the socio-demographic characters, age, gravid, gestational week, iron supplements and history of any disease, blood samples were drawn from a forearm antecubital vein and stored in tubes containing EDTA. The complete blood count variables were analyzed by a hematology analyzer (ADVIA 120 , Siemens). If the hemoglobin level of <11 gm/dl the pregnant women is considered as anemic [8]. All anemic pregnant women with hemoglobin <10g/dl were selected for detection of IDA , The non heparinized blood samples were centrifuged then the serum was stored in a clean plastic tubes at-20^{o}C till the time of analysis by using an Iron Kits (IRON-FERROZINE. Biosystems SPAIN, COD 11509) [9]. Serum ferritin analysis by using direct immunoenzymatic colorimetric determination. Biomeda, REFDKO039) [10].

Statistical Analysis

Chi-square test was used for finding the significance difference between the groups and correlated t-test was used to find the relation between the variables within the same group by using spss program [11].

Results

Out of 124 women in different stage of pregnancy ,there were 83 (67%) conceded anemic and 41(33%) were non anemic and the result of the study reveals that from the total anemic pregnant women ,there were 54(65%) suffering from iron deficiency anemia as shown in Figure-1. According to the form of anemia , 27 (32.5%) were suffering from mild anemic, 41 (49.4%) moderately anemic while15 (18.1%) severe anemic as shown in Figure- 2. The results showed that the number of anemic pregnant women from Baghdad was 39 (47%) and the internally displaced anemic pregnant women 44 (53%), there was no significant differences between the two groups as shown in Table-1 . The results reveled that the anemic pregnant women who were primigravida 36 (43.4%), while the pregnant women who were multipart gravida 47 (56.6%), no significant differences founded between the two groups as shown in Table- 2.

The number of anemic pregnant women was 26(31.3%) for age of 17-27y ,33(39.8%) for age of 28-37y and 24(28.9% for age of 38-45y ,there was a significant differences between the anemic and non anemic groups ,while the number of anemic pregnant women was 43(41%) at the first trimester ,31(37%) at the second trimester and 18(22%) at the third trimester and there was no significant differences between the two groups ,there were 62(69 %) from the total pregnant women got iron pills during the pregnancy period .From the total anemic pregnant women 9 (11%) recorded with pregnancy diabetes, 11 (13.3%) had pregnancy hypertension and 21(25%) suffered from placental previa, no significant differences between the two groups as shown in Table- 3. The total RBC_s and WBC_s count during the 1^{st}, 2^{nd} and 3^{rd} trimesters were (3.70±0.30, 3.96±0.59 and 4.76±0.24) . (4.62±1.23 , 8.31±2.45 and 13.22±3.60) respectively ,while the Hb levels were 8.78±1.39 , 10.93±1.21 and 12.33±0.18 a t the pregnancy trimesters, no significant differences between the three trimesters as in Table- 4. Serum iron and serum firrtin levels in iron deficiency ,non- iron deficiency anemia were (31.24±9.7 and 37.2±12.7) ,(4.90±3.4 and 311.10±135.2) respectively, there was a significant differences($p<0.05$) between the iron deficiency ,non- iron deficiency anemia and non anemic group, as in Table- 5.

Table 1- Distribution of anemic pregnant women according to the Socio-demographic characters

Socio-demographic characters	Number of anemic women%	Number of non anemic women%
Baghdad	39(47%)	24(59%)
IDP	44(53%)	17(41%)
Total	83(100%)	41(100%)

IDP internally displaced persons, p value (< 0.05)

Table 2- The number and percentage of anemic women who primigravida and multpara gravida.

Groups of pregnant women	Number of anemic women%	Number of non anemic women%
Primigravida	36(43.4%)	16(39%)
Multpara gravid	47(56.6%)	25(61%)
total	83(100%)	41(100%)

p value (< 0.05)

Table 3- The relation between some Clinical characters and anemia in pregnant women

Clinical characters		Number of anemic pregnant women%	Number of non anemic pregnant women%
Maternal age /years	17-27	26 (31.3%)	16(39%)
	28-37	33(39.8%)	22(54%)
	38-45	24(28.9%)	3(7%)
Gestational age	First trimester	34(41%)	25(61%)
	Second trimester	31(37%)	12(29%)
	Third trimester	18(22%)	4(10%)
Disease related to pregnancy	Diabetes mellitus	9(11%)	0
	Hypertension	11(13.3%)	10(24%)
	Placental previa	21(25%)	15(37%)

p value (< 0.05)

Table 4- The relation between some hematological parameters and the gestational age of anemic pregnant women M± SD.

Anemic pregnant women	Gestational age		
variables	First trimester	Second trimester	Third trimester
RBC (K/uL)	3.70±0.30	3.96±0.59	4.76±0.24
HGB (g/dL)	8.78±1.39	10.93±1.21	12.33±0.18
HCT%	30.43±4.42	37±3.79	40±0.51
MCV (fL)	69.23±3.67	74.02±3.51	78.26±4.33
MCH (pg)	18.12±1.27	24..89±2.67	31.40±1.10
WBC (K/uL)	4.62±1.23	8.31±2.45	13.22±3.60
PLT (K/uL)	211.2±34.7	236.1±43.1	246,1±55.6

Table 5- The variance of serum iron and serum firrtin levels in iron deficiency ,non- iron deficiency anemia and non anemic pregnant women M± SD.

Variables	IDA pregnant women	Non- IDA pregnant women	Non anemic pregnant women
S. iron (µg/dl)	31.24±9.7	37.2±12.7	132.5±10.2
S.frritin (ng/ml)	4.90±3.4	311.10±135.2	289.60±964.2

p value (< 0.05)

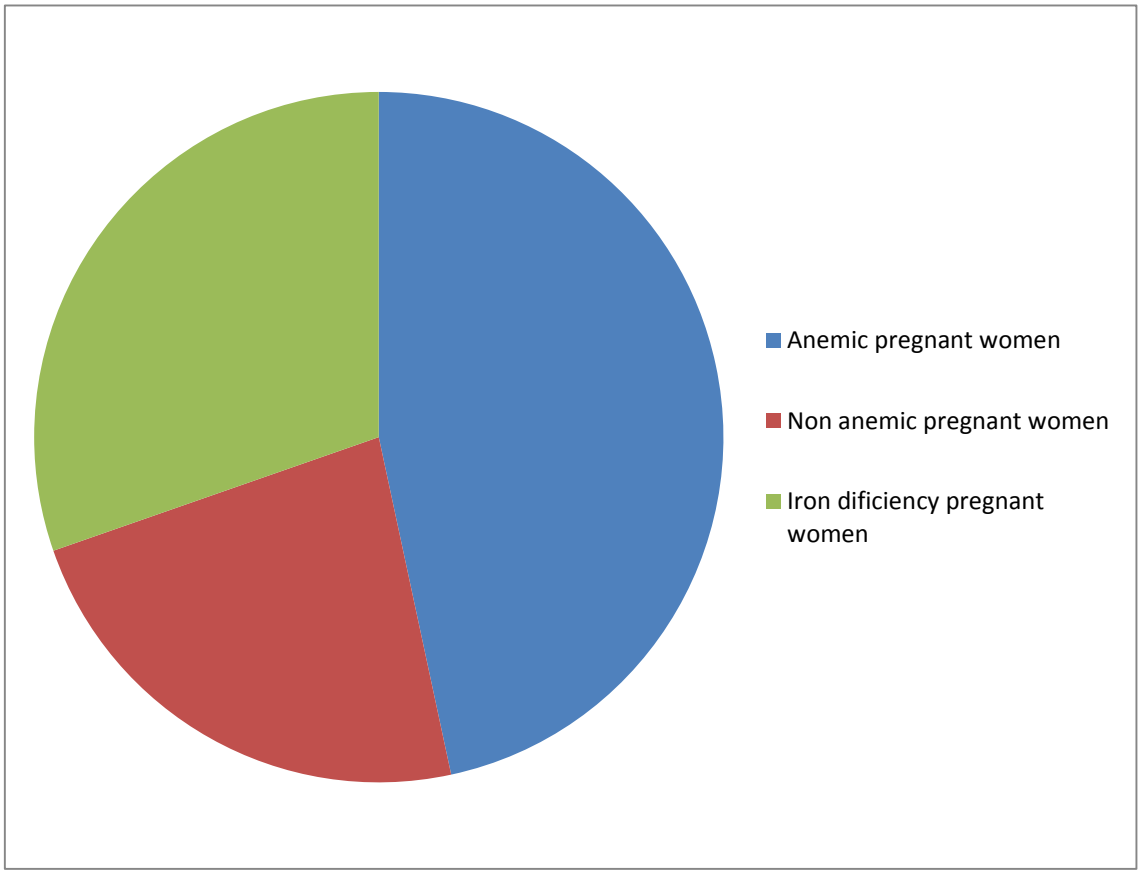

Figure 1- Distribution of anemic and non anemic pregnant women.

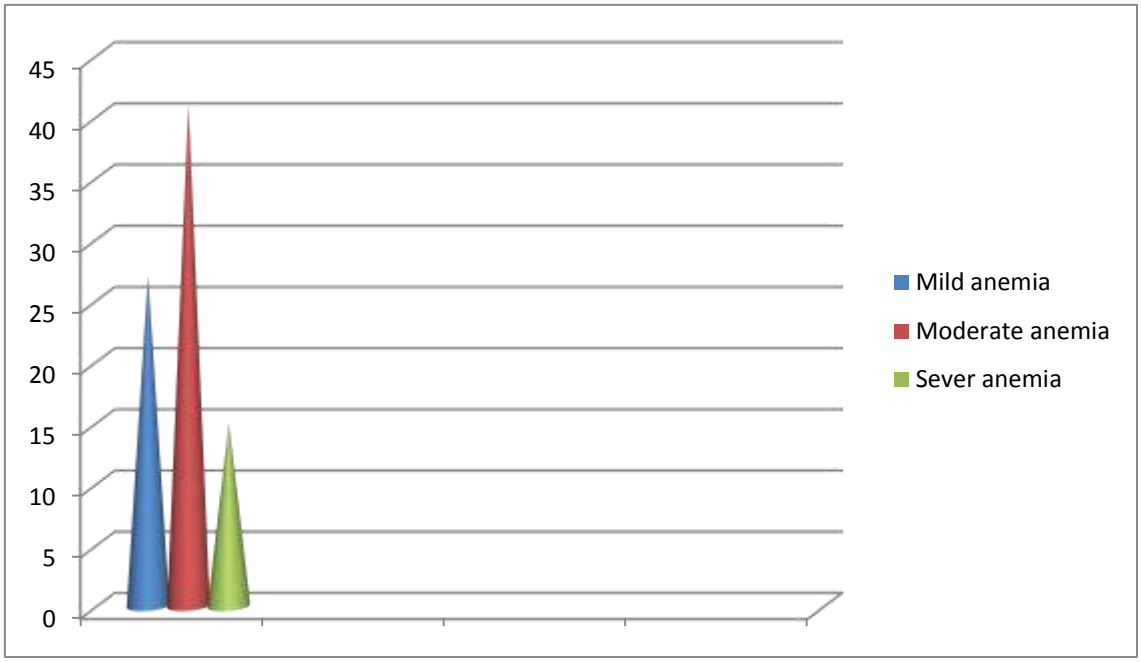

Figure 2- Distribution of anemic pregnant women according the form of anemia.

Discussion

The present study reveled that 83 (67%) from the total pregnant women were anemic while 41(33%) were non anemic and these results were similar to other study in Lahore as 80% of the total pregnant women were anemic and 20% were non-anemic.[12]. In other studies, from total 130 pregnant women there were 36.1% anemic and the percentage was found(38.6%) [13, 14]. This may be related to the methodological variation and samples numbers . Depending on the form of anemia , the majority of pregnant women had a moderate anemia 41 (49.4%) and this was close to other findings in Pakistan as the moderate anemic were 33% ,India (50.4%) and. Algeria (49.5%) [15-17]. The difference may be due to the exclusive using of hematinics [18]. The number of anemic pregnant women from Baghdad was 39 (47%) and the internally displaced 44 (53%) and this related to the bad healthy conditions and other life issues they had through .

The results reveled that the anemic pregnant women who were primigravida 36 (43.4%), while the pregnant women who were multipara gravida 47 (56.6%) and this was similar to other studies and this could be due to the depletion of inventories of iron in recurrent delivery [19].

The mean age of the pregnant women in this study was 31. 7±2.4 years, while in Kuwait the mean age of the pregnant women as 29.2±1.2 years [20]. The anemic and non-anemic pregnant then were divided according to age into three groups (17-27 , 28-38 and 39-45 years), 26 were in 1st group ,33 in 2nd group and 24 anemic in 3rd group . the non-anemic, 16 were in 1st group ,22 in 2nd group and 3 in 3rd group , from these results , the prevalence of anemia is higher in 28-38 years age group. And this is may be due to un healthy nutrition and having the fast food [21]. In the present study 41% of the anemic pregnant ladies were in 1st trimester, 37% are in 2nd and 22% in 3rd trimester, these results were different from other studies in Sweden and Holland [22] . The frequency of anemic women in 1st trimester showed high levels which is may be related to the poor dietary habits [23, 24]. Placental previa was the common complication of pregnancy followed by hypertension and diabetes (25, 13.3 and 11)% and this can be due to uncomfortable life and health conditions .

The study showed increase the levels of some hematological parameters during the third trimester of pregnancy and thiese results were closed to other studies in Kolkata and Tehran and this may be due to increase in plasma volume leading to hormonal disturbances and increases fluid retention and iron deficiency[25]. The leucocyte count was in high levels in the study may be a result of the development of fetus immunity and it is achieved by a state of selective immunotolerance, immunosuppression and immunomodulation in the presence of strong antimicrobial immunity[26] .Serum iron levels decrease in pregnant women., this agree with the results observed by other researches [27] (diala). As it is mainly due to the expansion of blood volume and hemoglobin mass

begins at the 2nd trimester . In the present study there is low serum frritin levels in IDA and non-IDA pregnent as compared to their values in non anemic pregnant women because the demanding of maternal and fetal for iron increased and these results were close to other studies in USA ,France and Malaysia [28-30] .

Conclusions

The prevalence of anemia among pregnant women was very clear in different forms at ages of less than 40 years and during the 1st trimester of pregnancy, Hypertension was commonly related to pregnancy beside few other complications due to poor dietary habit and lack of nutritional education , many strategies will be very helpful to prevent and control this problem by providing health facilities and handling the socioeconomic status .

References

1. Henry,W. **2014**. Food Security and Nutrition Assessment among South Sudanese Refugees in Adjumani, Arua and Kiryandongo Districts, New Caseload,Makerere University College of Health Sciences, Kampala, Uganda,.
2. Jufar, H. and Zewde, T. **2014** .Prevalence of anemia among pregnant women attending antenatal care at Tikur Anbessa Specialized Hospital. *Journal of Hematology and Thrombotic Diseases*. **2(**1): 1–6.
3. Gedefaw, J., Ayele, A., Asres, Y., and Mossie, A. **2015**. Anaemia and associated factors among pregnant women attending antenatal care clinic inWalayita Sodo town, Southern Ethiopia, *Ethiopian Journal of Health Sciences*, **25**(2): 155–162.
4. Viveki, G., Halappanavar, A., Viveki, P., Halki, B., Maled, V. and Deshpande, S. **2012.** Prevalence of anemia and its Epidemiological determinants in pregnant women. *Al Ameen Journal of Medical Sciences*, **5**(3): 216–223.
5. Demmouche, A., Khelil, S., and Moulessehoul, S. **2011**. Anemia among pregnant women in the Sidi Bel Abbes Region, West Algeria: An Epidemiologic Study. *Journal of BloodDisorder and Transfusion*, **2**(3): 1–7.
6. Olatunbosun, O., Abasiattai, M., Bassey, E., James, R., Ibanga, G., and Morgan, A**. 2014**. Prevalence of anaemia among pregnant women at booking in the University of Uyo teaching hospital, Uyo, Nigeria. *BioMed Research International*, **2014**, Article ID849080, 8 pages.
7. Srinivasa, R. and Srikanth, S. **2013**. Prevalence of anemia in the first trimester of pregnancy in rural population of Krishna District in Andhra Pradesh. *Scholars Journal of Applied Medical Sciences*, **1**(5): 570–574.,
8. Kefiyalew, F., Zemene, E., Asres, Y., and Gedefaw, L. **2014.** Anemia among pregnant women in Southeast Ethiopia: prevalence, severity and associated risk factors. *BMC Research Notes*, **7**, article 771.
9. Bang, S. and Lee, S. **2009**. The factors affecting pregnancy outcomes in the second trimester pregnant women. Nutr Res Pract; **3**(2): 134-140.
10. Madan, A., Palaniappan, L., Urizar, G., Wang, Y., Fortmann, S., Gould, J. **2006.** Sociocultural factors that affect pregnancy outcomes in two dissimilar immigrant groups in the United States. *Journal of Pediatrics*, **148**(3): 341-346.
11. Kalimbira, A., Mtimuni, B., Chilima, D. **2009**. Maternal knowledge and practices related to anemia and iron supplementation in rural Malawi. *Amarecan Journal for Food and Disease Control*, **9** (1): 550-564.
12. Taseer, H., Mirbahar, A., Safdar, S. and Awan, Z. **2011.** Anemia in pregnancy; related risk factors in under developed area. *Professional Medical Journal* Mar. **18**(1): 1-4.
13. Crige, J., Mclelland, D. and Watson, H. **2010**. *Blood Disease*s. In Colledge NR, Walker BR, Ralston SH, editor. Davidson's Principles and practice of medicine. 21st ed. London: Churchill Livingstone; P 1018.
14. Raoof, A. and AL-Hadithi, T. **2011.** Antenatal care in Erbil city, Iraq: assessment of information, education and communication strategy. *Duhok Medical Journal*, **5**(1): 31-38.
15. Nikiema, L., Kameli, Y., Capon, G., Sondo, B. and Martin, Y. **2010**. Quality of antenatal care and obstetrical coverage in rural Burkina Faso. *Health popular nutrition Journal*, **28**(1):67-75.

16. Paracha, P., Khan, S., Ahmad, I. and Nawab, G. **2007**. Effect of iron supplementation on biochemical indices of iron status in selected preadolescent school girls in Northwest frontier province Pakistan. *Asia Pediatric Journal of Clinical Nutrition*, **2**: 177-181.

17. Thompson, B. **2007**. *Food-based approaches for combating iron deficiency*. In: Kraemer K, Zimmemann MB, editors.Nutritional Anemia. Basel, Switzerland: Sight and Life Press; pp: 337-358.

18. Worwood, M. **2007**. Indicators of the iron status of populations: ferritin. In: WHO, CDC. Assessing the iron status of populations: report of a joint World Health Organization/ Centers for Disease Control and Prevention technical consultation on the assessment of iron status at the population level, 2nd ed. Geneva, World Health Organization, : 35-74

19. Adam, I., Khamis, A. and Elbashir, M. **2005.** Prevalence and risk factors for anaemia in pregnant women in eastern Sudan. *Transitional Record Society Tropical Medical Hygien.* **99**: 739–743

20. William, F. and Rayburn, M. **2007**. Maternal and fetal effects from substance use. *Clinical Perinatology*, **34**: 559-571.

21. Subramoney, S. and Gupta, P. **2008**. Anemia in pregnant women who use smokeless to tobacco. *Nicotine Tropical Research*, **10**: 917-920.

22. Vahidinia, A. and Shams, S. **2004**. Assessment of serum iron and iron deficiency anemia in sample of pregnant woman at delivery in Iran. *Asia Pediatrics Journal Clinical*, **13**: 159-163.

23. World Health Organization (WHO). **2007**. The database on anemia includes data by country on prevalence of anemia and mean hemoglobin. Geneva, Switzerland: WHO.

24. Ayoya, M., Spiekermann-Brouwer, G., Traore, A., Stoltzfus, R. and Garza, C. **2006**. Determinants of anemia among pregnant women in Mali. *Journal of Food and Nutrition*.

25. Chaoui, A., Faid, M. and Belhcen, R. **2003**. Effect of natural starters used for sourdough bread in Morocco on phytate biodegradation. *East Mediterranean Health Journal*, **9**: 141–147

26. Tolentino, K. and Friedman, J. **2007**. An update on anemia in less developed countries. *American Journal of Tropical Medical Hygiene*, **77**: 44-51.

27. Karaoglu, L., Pehlivan, E., Egri, M., Deprem, C., Gunes, G., Genc, M. and Temel, I. **2010**. The prevalence of nutritional anemia in pregnancy in an east Anatolian province, Turkey *Bio. Medical Clinical Public Health*, **10**: 329.

28. McLean, E., Cogswell, M., Egli, I., Wojdyla, D. and de Benoist, B. **2010**. Worldwide prevalence of anemia, WHO Vitamin and Mineral Nutrition Information System, 1993-2005. *Public Health Nutrition,* **12**: 444-454.

29. Levy, A., Fraser, D., Katz, M., Mazor, M. and Sheiner, E. **2005**. Maternal anemia during pregnancy is an independent risk factor for lowbirthweight and preterm delivery. *Europe Journal Obstetrician Gynecology and Biology*, **122**: 182-6.

30. Virender, P., Yogesh, B., Taneja, D. and Renuka, S. **2005**. Prevalence of anemia amongst pregnant women and its socio-demographic associates in a rural area of Delhi. *Indian Journal of Community Medicine*, **27**: 157-160.